

## CLAIMS

1. A method for energy management, in particular for the energy management of the on-board electrical system of a vehicle with a generator, at least one energy store and consumers which can be divided up into a plurality of classes, with the following steps:

determination of the condition of the generator and energy stores (s) (S1),

definition of the energy available in a subsequent time interval  $\Delta t$  from the determined condition data of the generator and energy store(s) (S4),

reception of activation requests from consumers for the subsequent time interval  $\Delta t$  (S5),

determination of the energy required in the subsequent time interval  $\Delta t$  on the basis of activation requests (S6),

checking whether the required energy is greater than the available energy (S7),

if the available energy is sufficient,

fulfillment of all activation requests of the consumers in the subsequent time interval (S8), or

if the available energy is not sufficient, selection of the consumer(s) to be activated in the subsequent time interval  $\Delta t$  according to the energy available and a priority and tolerance time ( $T_L$ ) of the corresponding consumers (S9).

2. The method for energy management as claimed in claim 1, characterized in that the selection of the consumer(s) to be activated in the subsequent time interval  $\Delta t$  comprises the following steps:

reduction of the minimum activation period of activated, pre-emptive consumers by a time interval  $\Delta t$

(S9-0),  
checking whether non-switchable consumers are  
requesting activation (S9-1),  
if so, checking whether the available energy is  
5 sufficient for all non-switchable consumers requesting  
activation (S9-2),  
if the energy is not sufficient, de-activation  
of pre-emptive consumers in the subsequent time  
interval  $\Delta t$  (S9-3) and setting of a tolerance time ( $T_L$ )  
10 of the deactivated, pre-emptive consumer(s) in the  
subsequent time interval to a maximum tolerance time  
( $T_{L,max}$ ) (S9-4), then similarly in the event that the  
available energy is sufficient for all non-switchable  
consumers requesting activation, activation of the  
15 conditionally switchable consumer(s) requesting  
activation in the subsequent time interval  $\Delta t$  (S9-5),  
if no non-switchable consumers are requesting  
activation or, following activation of the non-  
switchable consumer(s) requesting activation, checking  
20 whether energy is still available (S9-6),  
if so, checking whether consumers of different  
classes that are switchable and conditionally  
switchable in the subsequent time interval are  
requesting activation in the subsequent time interval  
25 (S9-7),  
if so, setting of a tolerance time ( $T_L$ ) of each  
consumer requesting activation in the subsequent time  
interval to a maximum tolerance time ( $T_{L,max}$ ) (S9-8), and  
of a hitherto unselected consumer requesting activation  
30 with the highest class and the lowest tolerance time  
( $T_L$ ) until no more energy is available (S9-9, S9-10),  
checking whether activated, pre-emptive  
consumers with a minimum activation period equal to or  
less than zero are available (S9-11),  
35 if so, de-activation of one or more of these  
consumers until the energy is sufficient or all

consumers of this type are deactivated (S9-12), then setting of the tolerance time ( $T_L$ ) to a maximum tolerance time ( $T_{L,max}$ ) and setting of the consumer status from "activated" to "waiting for activation" (S9-13),

checking whether energy is still available (S9-14), and, if energy is still available (S9-14), returning to step S9-9,

if no more energy is available, or if no activated, pre-emptive consumer with a minimum activation period equal to or less than zero is available,

activation of the selected consumer(s) in the subsequent time interval (S9-15) and setting of the tolerance time ( $T_L$ ) of this/these consumer(s) in the subsequent time interval  $\Delta t$  to 0 (S9-16), and,

if the activation is carried out or it has been established that no more energy is available for activation of switchable consumers, reduction of the tolerance time ( $T_L$ ) of consumers not yet activated but waiting for activation by  $\Delta t$  (S9-17).

3. The method for energy management as claimed in claim 2, characterized, if no switchable consumers are requesting activation or the tolerance time ( $T_L$ ) of consumers not yet activated but waiting for activation has been reduced, by checking whether the tolerance time ( $T_L$ ) of at least one of the consumers requesting activation but not yet activated is equal to or less than 0 (S9-18), and,

if not, returning to the start, otherwise switching over to an emergency operation I (S9-19), in which the entire class of this consumer is deactivated for a predefined time period ( $t_1$ ).

4. The method for energy management as claimed

in claim 2 or 3, characterized in that steps S9-11 to S9-14 are carried out only for class II consumers requesting activation.

5        5.            The method for energy management as claimed in one of claims 2 to 4, characterized in that the maximum tolerance times ( $T_{L,max}$ ) can be changed dynamically during driving operation.

10       6.            The method for energy management as claimed in claim 4, characterized in that the maximum tolerance times ( $T_{L,max}$ ) can be changed depending on driving conditions.

15       7.            The method for energy management as claimed in one of claims 1 to 5, characterized in that it is additionally established on the basis of the determined data relating to the condition of the generator whether the generator is running (S2) and, if so, the procedure  
20       involving the definition of available energy continues, otherwise switchover takes place to an emergency operation II (S3), in which all switchable consumers are deactivated (S3-1) and the driver is then prompted to stop the vehicle (S3-2).

25       8.            The method for energy management as claimed in one of claims 1 to 6, characterized in that the consumers can be divided up into classes dynamically during driving operation.

30       9.            The method for energy management as claimed in claim 7, characterized in that the dynamic division of consumers is dependent on external factors.